

**UNIVERSITI TEKNOLOGI MARA**

**HEALTH-RELATED QUALITY OF  
LIFE OF TYPE 2 DIABETES  
MELLITUS PATIENTS: A STUDY IN  
SOME SELECTED HOSPITALS IN  
MALAYSIA**

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Thesis submitted in fulfillment  
of the requirement for the degree of  
**Doctor of Philosophy**

**Faculty of Computer and Mathematical Sciences**

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## **CONFIRMATION BY PANEL OF EXAMINERS**

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## AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with regulations of University Teknologi MARA. It is original and is the results of my work, unless otherwise indicated or acknowledge as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any other degree or qualification.

I, hereby, acknowledge that I have been supplied with Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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## ABSTRACT

This thesis presents the work on modelling Quality of Life (QoL) among Type 2 Diabetes Mellitus (T2DM) through the development of a Structural Equation Model (SEM). The motivation behind this research is influenced by several factors. Firstly, T2DM is an alarming global health issue and this has lead interest among researchers and healthcare providers to find ways to reduce the T2DM prevalence. Secondly, the effect of T2DM is known to affect HRQoL of patients and although intervention measures have been implemented, significant results have yet to be achieved. An extensive literature review was made to obtain a better insight on T2DM and the evolution of an SEM model for HRQoL data. This research involved three phases, which are the psychometric testing of the Malay versions of the Audit of Diabetes Dependent QoL (ADDQoL) and the Problem Areas in Diabetes Scale (PAID); modelling the HRQoL of T2DM patients and a simulation study. Firstly, a convenience sample of 309 T2DM outpatients were examined in the cross-sectional research phase. Confirmatory Factor Analysis (CFA) confirmed a three-factor solution of MY-PAID-20. Strong content validity and internal consistency reliability (Cronbach's  $\alpha = 0.950$ ) was demonstrated. A one-factor solution of the MY-ADDQoL which was similar to the original version was confirmed and internal consistency reliability was high (Cronbach's  $\alpha = 0.945$ ). In the second phase, the developed theoretical SEM was evaluated. SEM results showed that medication adherence (MMAS) had a significant direct effect on diabetes distress (PAID) ( $\hat{\beta} = -0.20$ ). The self-care activities (SDSCA) construct was significantly related to PAID ( $\hat{\beta} = -0.24$ ). SDSCA was found to have a significant relationship with HRQoL (SF-36) ( $\hat{\beta} = 0.11$ ). Additionally, diabetes distress had a significant effect ( $\hat{\beta} = -0.11$ ) on HRQoL of patients. Finally, ADDQoL had a significant effect on HRQoL ( $\hat{\beta} = 0.12$ ). Gender and ethnicity was found to have an effect on the theoretical paths as moderators. In the third phase, the Monte Carlo simulation method using R programming was used to evaluate the effect of non-normality on Covariance Based-SEM (CB-SEM) and Partial Least Squares-SEM (PLS-SEM) path estimates. Simulation results showed that under normality conditions, PLS-SEM had an advantage over CB-SEM at  $n=20$ . For large sample sizes of  $n=150,200$ , the path estimates were close to the theoretical estimates for both CB-SEM and PLS-SEM. Under nonnormality conditions, at  $n=20, 40$ , CB-SEM could not estimate the path values compared to PLS-SEM which was able to extract estimates close to the true values. At  $n=90$ , CB-SEM path estimates were closer to the theoretical values.

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